

### Abstract of the Disclosure

A method and apparatus for use in manufacturing a semiconductor device strips a polysilicon hard mask without damaging the layer left exposed by openings formed by using the polysilicon hard mask as an etching mask. The method  
5 includes forming a polysilicon hard mask in a pattern on a first layer to expose a portion of the first layer, dry etching the exposed portion of the first layer using the polysilicon hard mask as an etching mask to form an opening in the first layer, and thereafter removing the polysilicon hard mask by supplying an etching gas onto the polysilicon hard mask in a direction parallel to the major surface of the  
10 semiconductor substrate. The processing apparatus includes a reaction chamber including a spin chuck which supports the semiconductor substrate for rotation, a gas supply unit for supplying a process gas to the reaction chamber, a gas injection unit for injecting the process gas supplied by the gas supply unit into the reaction chamber in a direction parallel to the major surface of the semiconductor substrate,  
15 and an exhaust unit for exhausting gases from the reaction chamber.